## CLAIMS

1. A crucible for growth of a single crystal along the crystal plane of a seed by melting and cooling an optical part material, characterized in that the surface roughness of the inner surface of the crucible as measured by the maximum height method is no greater than Rmax 6.4s.

2. A crucible according to claim 1, wherein the crucible inner surface is composed of glossy glass-like carbon.

3. A crucible according to claim 1 or 2, which is composed of carbon as the material.

4. A crucible for growth of a single crystal along the crystal plane of a seed by melting and cooling an optical part material, characterized in that a tapered cone surface is formed between the starting material carrying section in which the starting material of said optical part material is loaded and the seed carrying section in which said seed is loaded, the wall surface of said starting material carrying section is smoothly connected to the cone surface via a concave curved plane, and said cone surface is smoothly connected to the wall surface of the seed carrying section via a convex curved plane.

5. A crucible for growth of a single crystal along the crystal plane of a seed by melting and cooling an optical part material, characterized in that the cone angle of the tapered cone surface formed between the starting material carrying section in which the starting material of said optical part material is loaded and the seed carrying section in which said seed is loaded is set in a range between 95° and 150°.

6. A crucible for growth of a single crystal along the crystal plane of a seed by melting and cooling an optical part material, characterized in

that the contact angle between the crucible inner surface and water droplets is no greater than 100°.

7. A crucible according to claim 6, wherein the crucible inner surface is composed of glass-like carbon.

8. A crucible according to claim 7, wherein the portions other than the crucible inner surface are composed of carbon as the material.

9. A crucible for growth of a single crystal along the crystal plane of an optical part material seed by melting and cooling the optical part material, characterized by comprising

a starting material carrying section in which the starting material of said optical part material is loaded, and

a seed carrying section in which said seed is loaded,

wherein the bottom of said seed carrying section has a shape matching the edge of said seed.

10. A crucible according to claim 9, wherein

the edge of said seed has an edge face and a side connected to said edge face,

while the bottom of said seed carrying section has a bottom face and a wall surface which is connected to said bottom face and matches the side of said seed,

wherein both said edge face and said bottom face are flat surfaces.

11. A crucible according to any one of claims 1 to 10, wherein said optical part material is calcium fluoride.

12. A single crystal growth method whereby a single crystal of an optical part material is grown using a crucible according to any one of claims 9 to 11, characterized by comprising

a seed loading step in which a seed having an edge with a shape matching the bottom of said seed carrying section is loaded as the seed in said seed carrying section of said crucible,

a starting material loading step in which said optical part material is loaded as the starting material in said starting material carrying section, and

a growth step in which a single crystal of the optical part material is grown along the crystal plane of said seed by melting and cooling said starting material in said crucible.

13. A crucible for growth of a single crystal of an optical part material, characterized by comprising

a closed-bottom seed carrying section extending in the vertical direction, in which a seed is loaded,

a starting material carrying section in which the single crystal of said optical part material is loaded, which is situated above said seed carrying section and is connected to said seed carrying section, and

temperature detecting means for detection of the internal temperature of said seed carrying section.

14. A crucible according to claim 13, characterized in that said temperature detecting means is a thermocouple, and said thermocouple is situated at a position near the wall surface of said seed carrying section.

15. A crucible according to claim 14, characterized in that a plurality of thermocouples are used and are situated at mutually separated positions in the vertical direction.

16. A crucible according to claim 15, characterized in that one of the

two thermocouples is situated at a position at a height above the bottom end of said seed carrying section corresponding to 25-50% of the depth of said seed carrying section, while the other is situated at a position at a height above the bottom end of said seed carrying section corresponding to 60-80% of the depth of said seed carrying section.

17. A crucible according to any one of claims 13 to 16, wherein said optical part material is calcium fluoride.

18. A single crystal growth method characterized by comprising

a step of preparing a crucible according to any one of claims 13 to 17,

a step of loading the seed of the optical part material into said seed carrying section,

a step of loading the starting material for the single crystal of said optical part material into said starting material carrying section,

a step of situating said crucible in a crystal growth furnace heated in such a manner that the interior has a specified temperature gradient in the vertical direction, and heating said crucible so that the starting material carried in said starting material carrying section and the seed carried in said seed carrying section gradually melt from top to bottom,

a step of detecting the internal temperature of said seed carrying section by said temperature detecting means during heating of said crucible, and

a step of terminating the heating and commencing the cooling for growth of a single crystal when, based on the internal temperature of said seed carrying section detected by said temperature detecting means, the boundary position between the melted portion and unmelted portion of the seed carried in said seed carrying section is judged to be between

a first position which is at a prescribed height above the bottom end of said seed carrying section and a second position which is at a prescribed height above said first position.

19. A single crystal growth method according to claim 18, wherein said first position is a position at a height above the bottom end of said seed carrying section corresponding to 25% of the depth of said seed carrying section, and said second position is a position at a height above the bottom end of said seed carrying section corresponding to 80% of the depth of said seed carrying section.